MINUTES
of the
SIXTH MEETING
of the
RADIOACTIVE AND HAZARDOUS MATERIALS COMMITTEE

November 26, 2007
Room 321, State Capitol
Santa Fe

The sixth meeting of the Radioactive and Hazardous Materials Committee (RHMC) was called to order by Representative John A. Heaton, chair, at 9:15 a.m. on Monday, November 26, 2007, in Room 321 of the State Capitol in Santa Fe, New Mexico.

Present
Rep. John A. Heaton, Chair
Sen. Richard C. Martinez, Vice Chair
Sen. Vernon D. Asbill
Rep. William J. Gray
Sen. John T.L. Grubesic
Sen. Carroll H. Leavell
Rep. Jim R. Trujillo
Rep. Jeanette O. Wallace

Absent
Sen. Gay G. Kernan
Rep. Antonio Lujan

Advisory Members
Sen. Rod Adair
Rep. Thomas A. Anderson
Sen. John Pinto
Rep. Nick L. Salazar
Rep. Jeff Steinborn
Rep. Donald E. Bratton
Sen. Mary Jane M. Garcia
Sen. William H. Payne
Rep. Peter Wirth

Staff
Evan Blackstone
Aldis Philipbar

Guest List
The guest list is in the original meeting file.

<u>Monday, November 26</u>

Committee Business
Representative Heaton began the meeting by discussing the two pieces of proposed legislation that the committee will consider for endorsement. The first bill enacts the Uranium Legacy Cleanup Act and establishes a fund that will be used to provide financial assistance for the cleanup of uranium mining legacy sites that are contaminated. The bill creates a source of

revenue for the fund by imposing a surtax on uranium extraction. The second piece of legislation, a memorial, urges the United States Department of Energy and the United States Congress to allow for the disposal of greater-than-class-C (GTCC) low-level radioactive waste in the Waste Isolation Pilot Plant (WIPP).

Recommendations of the Clean and Diverse Energy Advisory Committee (CDEAC) to the Western Governors

Sarah Cottrell, energy and environment advisor to the governor, reviewed for the committee the CDEAC recommendations and what actions the governor is taking in New Mexico pursuant to the recommendations. She began by explaining that the Western Governors' Association (WGA) represents the governors of 19 states and three United States Pacific Islands. The WGA was convened to address important policy and governance issues in the West and advance the role of the western states in the federal system. The WGA focuses on natural resources, the environment, human services, economic development, international relations and state governance. The goals of the WGA include bringing 30,000 megawatts of clean energy to the West by 2015, increasing energy efficiency by 20 percent by 2020 and meeting transmission needs over the next 25 years. The CDEAC and seven task forces were formed to develop a plan to meet these goals. Ms. Cottrell said that the CDEAC developed 51 recommendations, and she believes that the goals of the governors will be able to be met and exceeded.

Ms. Cottrell explained that in November 2007, Governor Richardson issued an executive order announcing statewide energy efficiency goals. Among other things, the executive order sets statewide targets consistent with the CDEAC recommendations. Ms. Cottrell stated that the overall budget for the plan was estimated to be approximately $30 million. She added that the lack of emphasis on nuclear power reflects the mixed feelings among WGA members about the future of nuclear energy in the United States.

Questions and comments included:

- regulatory hurdles;
- concern about energy efficiency in buildings leased by state government;
- costs for items included in the governor's budget;
- issues with transmission line lawsuits; and
- penalties for not meeting energy efficiency standards.

Joanna Prukop, secretary of energy, minerals, and natural resources, informed the RHMC of recent events on the federal and state levels regarding uranium mining and cleanup. She stated that, recently, she testified before the United States Senate Committee on Energy and Natural Resources in Washington, D.C. She informed the United States Senate committee that there are over 15,000 non-coal mine sites in the West that need cleaning up, and she encouraged committee to allow the use of abandoned mine funding for uranium reclamation. Secretary Prukop also explained to the RHMC that her department is in the process of taking an inventory of uranium mining and milling sites in New Mexico that require reclamation; however, she noted that there is not much reclamation occurring either due to lack of funding or because sites are

ignored. She emphasized that legacy site reclamation funding issues need to be addressed from a variety of directions. Secretary Prukop went on to describe some problems associated with in situ leach extraction mining.

Solar Electricity Generation

Dr. Thomas Mancini, concentrating solar power program manager, Sandia National Laboratories, began by reviewing for the RHMC the various applications of solar energy. Its distributed uses include heating and cooling, domestic hot water and rooftop photovoltaic electricity, while large-scale uses include utility scale power. Dr. Mancini explained that concentrating solar power allows tailored design approaches for central and distributed power generation. Concentrating solar power has demonstrated high capacity factor dispatchable power with thermal storage or hybridization, 130 plant years of commercial operation and 80 megawatts per year of production and installation capacity. He went on to state that the current bid costs are in the range of $.12 to $.16 per kilowatt hour.

Dr. Mancini also discussed the varying capacities between commissioned solar plants and the value of storing solar power. He noted that storage and hybridization provide decoupling of energy collection and generation and lower costs because storage is less expensive than incremental turbine costs. Dr. Mancini emphasized that New Mexico has the potential for more than 2000 megawatts of concentrated solar power capacity, and with new transmission, the state could export large amounts of clean energy.

Plug-In Hybrid Cars

Roger Duncan, deputy general manager, Austin Energy, began by stating that the purpose of the Plug-In Partners campaign is to demonstrate a national market for flexible-fuel plug-in hybrid electric vehicles (PHEVs). He said that there are several advantages to using electricity for vehicles. For example, the cost of electricity compared to gas is less than $1.00 per gallon of gasoline. Furthermore, the infrastructure is already in place, there are no emissions and multiple renewable fuels can be used, including solar and wind. Mr. Duncan explained that PHEVs use the same technology as the hybrids on the road today, but have a more powerful battery that can be recharged in a standard home outlet. The battery pack can power the vehicle from 20 to 60 miles on the battery charge alone and holds a six- to eight-hour charge, depending on the design. With mass production, the cost of a PHEV battery will only add $2,000 to $3,000 to the cost of a conventional hybrid.

Mr. Duncan also discussed the drive trains for PHEVs. He stated that series hybrids use only their internal combustion engines to generate electricity, while parallel hybrids use both an internal combustion engine and an electric motor to drive the wheels. PHEV technology can be used for sedans, vans, SUVs, shuttle buses, school buses and medium- to heavy-duty trucks.

Questions and comments included:

- the length of the battery charge for PHEVs;
- the weight and power of PHEVs;

- how heat and air conditioning function in a PHEV; and
- where batteries are placed in PHEVs.

Committee Business and Consideration of Legislation

On a motion made, seconded and unanimously approved, the minutes of the October 29-30, 2007 meeting were approved as submitted.

On a motion made by Senator Leavell and seconded by Senator Asbill, the committee unanimously endorsed the memorial urging the United States Department of Energy and the United States Congress to allow for the disposal of GTCC low-level radioactive waste at WIPP. On a motion made by Senator Asbill and seconded by Representative Gray, the committee unanimously endorsed the bill enacting the Uranium Legacy Cleanup Act upon the condition that amendments be made to the surtax provisions to reflect that the surtax shall be imposed at an amount equal to the greater of two percent on the taxable value of uranium or $1.00 per pound of uranium.

Nuclear Fuel Reprocessing Overview

Sara Scott, program director for civilian nuclear programs at Los Alamos National Laboratory (LANL), began by giving an overview of the agenda for the presentation and introducing members of the LANL staff present at the meeting.

Dr. Rick Wallace, group leader in the Nuclear Nonproliferation Division at LANL, gave the committee an introduction to the terminology and nuclear energy principles of nuclear fuel reprocessing. Dr. Wallace discussed atoms, isotopes and the decay process. He explained that nuclear energy comes from the nucleus of an atom. Dr. Wallace stated that uranium is always composed of 92 protons and a varying number of neutrons. The most common form of uranium is U238, which has 92 protons and 146 neutrons. U235 is used to produce energy.

Dr. Wallace stated that the various forms of radioactive decay include neutron, alpha, beta and gamma decay and spontaneous fission. The most hazardous forms of external exposure are from neutrons and gammas. Alpha radiation is most hazardous when inhaled or ingested. Dr. Wallace informed the committee that very large nuclei are susceptible to being split apart through fission. The release of excess neutrons in fission makes a chain reaction possible.

Gordon Jarvinen, associate director for the Seaborg Institute at LANL, explained to the committee separations technology and reprocessing options. He noted that heat generation from high radioactivity of spent nuclear fuel requires storage under water for a period of years. The present policy in the United States calls for direct disposal of spent commercial nuclear fuel in a geological repository that can control the release of radioactive byproducts in the spent fuel for at least one million years, which is known as a "once through" or "open" cycle. Mr. Jarvinen explained that a "closed" nuclear fuel cycle refers to the processing of used nuclear fuel to recover additional energy from actinides and place residual material in a more efficient disposal form. He indicated that plutonium-uranium reduction extraction (PUREX) is a liquid-liquid

extraction process developed to recover plutonium (Pu) for weapons production. This process separates Pu from uranium (U) and separates fission products from Pu and U. PUREX has been used to separate hundreds of metric tons of plutonium and tens of thousands of metric tons of uranium from spent fuel. A process known as TRUEX has also been developed to extract americium, curium, residual plutonium and lanthanides from PUREX raffinate or acidified tank wastes.

Mr. Jarvinen then reviewed the goals of the Global Nuclear Energy Partnership (GNEP) separations technology program. These goals include: precluding or significantly delaying the need for a second geological repository in this century; reducing the volume and cost of high-level waste disposal; separating elements for fissioning in the thermal or fast neutron spectrum reactors; reducing the proliferation risk of the fuel cycle; and facilitating Generation IV nuclear energy systems. Mr. Jarvinen added that separating the elements, at least into groups, makes it more difficult to divert certain elements to weapons development.

Michael Cappiello, deputy director of the Technical Integration Office for Research and Development at LANL, presented information on fast reactors and the closed fuel cycle. He began by comparing fast reactors to light water reactors. Fast reactors use sodium as opposed to water, have a coolant pressure of 50 pounds per square inch (psi) compared to 2200 psi and have an outlet temperature of 900 degrees Fahrenheit compared to 600 degrees. Fast reactors have been used in Idaho, Michigan, Arkansas and Washington in the past, but there are currently none in the United States. Mr. Cappiello then noted that there are 104 light water reactors. He stated that there is no need for uranium enrichment in fast reactors. Mr. Cappiello said that as an integral part of the closed fuel cycle, fast reactors provide the opportunity to reduce waste and manage proliferation risks.

Finally, Ned Elkins, group leader of LANL's Carlsbad operations, discussed the impacts of repositories. He began by discussing the various entities involved in regulating repositories. He said that the repositories are highly regulated, but that transportation is an important issue that is difficult to regulate. Mr. Elkins said there are many variables involved in choosing a site as a repository. He added that a large-scale industrial facility will not be built soon and that it only makes sense to stop making light water reactors if the waste is recycled.

Questions and comments included:

- the storage length of nuclear fuel rods;
- other countries interested in nuclear power and how that affects nonproliferation;
- the need for enriched uranium in fast reactors;
- the stability of fast reactors;
- the use of uniform safety standards by different countries;
- the amount of waste that currently requires disposal;
- the percentage of waste reduced by reprocessing; and
- type of reactors planned for the GNEP in southeast New Mexico.

There being no further business, the committee adjourned at 3:30 p.m.